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EXAMINER	
THOMPSON, JAMES A	

ART UNIT	PAPER NUMBER
2624	

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/629,993	TAI ET AL.	
	Examiner	Art Unit	
	James A. Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 February 2005 and 04 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 16-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *25 February 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/4/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 25 February 2005 have been fully considered but they are not persuasive.

Regarding page 8, lines 2-5: It is true that the reference numerals missing from figure 5 have been added to the new figure 5. The objection to figure 5 is therefore withdrawn. However, the reference numerals missing in figures 9 and 24 are not present in the newly submitted drawings. Therefore, the objections to figures 9 and 24 are maintained and repeated below.

Regarding page 8, line 6 to end of page 8: The rejection of claim 15 is withdrawn since claim 15 has been cancelled. The remainder of Applicant's arguments are directed to the present amendments to the claims, and not to the claims as filed prior to the previous office action, dated 02 August 2004.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: "18b" and "20b" in figure 5; "910", "920", "930", "950" and "960 in figure 9; and "247" in figure 24. Corrected drawing sheets, or amendment to the specification to add the reference character(s) in the description, are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-6, 9-14 and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crean (US Patent 5,745,249) in view of Shimura (US Patent 5,886,797).

Regarding claim 1: Crean discloses an image processing method comprising the step of providing digitized image data that has a plurality of pixels (column 4, lines 30-34 of Crean), each of the pixels having a halftoned microdot density (column 5, lines 9-12 of Crean), the microdot existing within one of a plurality of halftoning planes (column 6, lines 9-21 of Crean), wherein the halftoning planes are indicative of an intensity value for the pixels (column 4, lines 12-20 of Crean); forming a plurality of tiles from the microdots (figure 1 and column 4, lines 61-64 of Crean) in accordance with a screen angle (column 4, lines 62-64 of Crean) and a line ruling from a halftone

screen (column 5, lines 16-22 of Crean) used to convert the pixels into the microdots (column 5, lines 23-27 of Crean), wherein each of the tiles comprises a repetitive sequence of microdots (column 6, lines 28-35 of Crean); associating each of the microdots within the tiles by a coordinate position as well as the density value (column 5, lines 9-16 of Crean); and storing the tiles into a buffer having a length and a width (figure 11 and column 10, lines 5-12 of Crean). The address of the data in the buffer is based on both the row number and column number of each dot.

Crean further discloses placing into the buffer an offset determined by the tile geometry, wherein the offset acts as a pointer to read data out offset by a predetermined amount in order to generate the repetitive sequence of microdots (column 6, lines 31-35 of Crean); and reading the buffer to retrieve stored image data comprising density value (column 7, lines 37-46 of Crean).

Crean does not disclose expressly that said digitized image data is specifically a rasterized color separated contone gray level image data.

Shimura discloses providing rasterized color separated contone gray level image data (column 5, lines 16-24 of Shimura).

Crean and Shimura are combinable because they are from the same field of endeavor, namely digital image data enhancement. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use rasterized color separated contone gray level image data (RIP Data) as the input data, as taught by Shimura. The motivation for doing so would have been that color separated raster image data is the type of

data that is acquired when an image is scanned in with a CCD, and said image may include a photograph region (column 5, lines 13-18 of Shimura). Therefore, it would have been obvious to combine Shimura with Crean to obtain the invention as specified in claim 1.

Regarding claim 2: Crean discloses that the density value for a pixel is a stored value that characterizes the value of the microdots in the halftone plane (column 7, lines 7-16 of Crean).

Regarding claim 3: Crean discloses using a brick based on the range of the continuous tone level in a region (column 5, lines 5-8 of Crean). This performs the same essential function as using an average density value for the tile since there is generally a wide range of pixel values in a real image. Using a range of tone levels or an average density value will both allow a determination whether or not to use a brick for a certain image or portion of an image.

Regarding claim 4: Crean discloses that the density value is a stored value within the buffer, the density value being an output from the halftone plane (column 7, lines 7-16 of Crean). The density value is an output from the halftone plane since it is based on the thresholding operations (column 7, lines 10-12). The density value is stored in the memory buffer (column 7, lines 11-16 of Crean).

Regarding claim 5: Crean discloses that the halftone plane is an input halftone plane that functions as an address to the buffer (column 7, lines 17-22 of Crean), the buffer data addressed being the density value that is an output halftone plane that is represented by a different number of bits than the input halftone plane (figure 10 and column 9, lines 1-22 of

Crean). Crean teaches the option of performing image enhancement to eliminate stair-casing effects on the edges of characters and line art. Said enhancement requires an increase in the number of bits used.

Regarding claim 6: Crean discloses that the halftone plane is an input halftone plane that functions as an address to the buffer (column 7, lines 17-22 of Crean), the buffer data addressed being the density value that is an output halftone plane that is represented by the same number of bits as the input halftone plane (column 7, lines 44-48 of Crean). Image data is sent to the memory buffer and later output at the same rate by the output device. Resolution enhancement may be performed on the output data (column 9, lines 1-7 of Crean), but is not an essential operation and may be omitted if circumstances allow or require.

Regarding claim 9: Crean discloses forming tiles of halftone threshold values that are repeated throughout the image, offset at each column (figure 1 and column 4, lines 61-64 of Crean). A brick as defined by Crean is essentially a tile that contains a sequence of halftone threshold values for pixels (column 5, lines 1-8 of Crean). In order to determine the coordinate relative to the tile sequence in the X-direction (denoted by I), the image pixel address for both the row and the column (figure 1(20,L,P) and column 5, lines 9-12 of Crean), the overall width of the tile (figure 1(20,L) and column 4, line 62 of Crean), and the offset of the tile (figure 1(20,S) and column 4, lines 63-64 of Crean) must be considered. For a single tile at the origin, the pixel address relative to the overall image in the x-direction would be given by X. The output device scans in the X-direction, reaches the end, and returns to the

beginning to resume scanning for each line (column 5, lines 12-19 of Crean). Therefore, for a tile that has a height in the Y-direction of 1, a width of Bw (L in Crean) and an offset of Bs (S in Crean) (column 5, lines 16-22 of Crean), the coordinate value I would inherently be determined according to a calculation wherein I = (X+Y*Bs)%Bw, where % denotes the remainder of the division operation that is retained as the coordinate value.

Regarding claim 11: Crean discloses forming bricks of halftone threshold values that are repeated throughout the image, offset at each column (figure 1 and column 4, lines 61-64 of Crean). In order to determine the coordinate relative to the tile sequence in the X-direction (denoted by I), the image pixel address for both the row and the column (figure 1(20,L,P) and column 5, lines 9-12 of Crean), the overall width of the brick (figure 1(20,L) and column 4, line 62 of Crean), and the offset of the brick (figure 1(20,S) and column 4, lines 63-64 of Crean) must be considered. For a single brick at the origin, which contains a block of a sequence of pixels (column 5, lines 1-8 of Crean), the pixel address relative to the overall image in the x-direction would be given by X. The output device scans in the X-direction, reaches the end, and returns to the beginning to resume scanning for each line (column 5, lines 12-19 of Crean). Therefore, for a brick that has a height in the Y-direction of Bh (P in Crean), a width of Bw (L in Crean) and an offset of Bs (S in Crean) (column 5, lines 16-22 of Crean), the coordinate value I would inherently be determined according to a calculation wherein I = (X+(Y/Bh)*Bs)%Bw, where % denotes the remainder of the division operation that is retained as the coordinate value.

Regarding claim 12: Crean discloses a brick that has a height, which can be denoted by Bh (P in Crean) (figure 1 of Crean). For a plurality of bricks, the coordinate relative to the brick that is in the Y-direction, denoted by J, can be given based on the coordinate relative to the overall image that is in the Y-direction. Therefore, J would inherently be determined according to a calculation wherein J = Y%Bh, where % denotes the remainder of the division operation that is retained as the coordinate value.

Regarding claim 13: Crean discloses the step of blending rendered values from the halftoning process via at least one additional halftoning process (figure 10 and column 9, lines 42-55 of Crean). Image enhancement and visual smoothing can be performed for halftoning the data.

Regarding claim 14: Crean discloses the step of edge enhancement processing (column 9, lines 43-46 of Crean). Edges can be smoothed by means of resolution enhancement (column 9, lines 23-48 of Crean).

Regarding claim 22: Crean discloses an image processor (figure 4(52) of Crean) for providing contone gray level image data representing a plurality of pixels (column 7, lines 10-16 of Crean); and a halftone processor (figure 4(40) of Crean) for establishing a coordinate value (column 10, lines 5-12 of Crean) of a current pixel to be rendered (figure 11 and column 5, lines 9-16 of Crean) and based thereon rendering the current pixel into output halftone gray level pixel values (column 6, lines 15-21 of Crean) represented in a plurality of halftoning planes (figure 10 and column 6, lines 9-16 of Crean).

Crean does not disclose expressly that said image processor is specifically a raster image processor and that said contone

gray level image data is specifically rasterized color separated contone gray level image data.

Shimura discloses providing rasterized color separated contone gray level image data (column 5, lines 16-24 of Shimura).

Crean and Shimura are combinable because they are from the same field of endeavor, namely digital image data enhancement. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use rasterized color separated contone gray level image data (RIP Data) as the input data, as taught by Shimura. The image processor taught by Crean would therefore specifically be a raster image processor. The motivation for doing so would have been that color separated raster image data is the type of data that is acquired when an image is scanned in with a CCD, and said image may include a photograph region (column 5, lines 13-18 of Shimura). Therefore, it would have been obvious to combine Shimura with Crean to obtain the invention as specified in claim 22.

Regarding claims 10 and 16: Crean discloses forming bricks of halftone threshold values that are repeated throughout the image, offset at each column (figure 1 and column 4, lines 61-64 of Crean). In order to determine the coordinate relative to the tile sequence in the X-direction (denoted by I), the image pixel address for both the row and the column (figure 1(20,L,P) and column 5, lines 9-12 of Crean), the overall width of the brick (figure 1(20,L) and column 4, line 62 of Crean), and the offset of the brick (figure 1(20,S) and column 4, lines 63-64 of Crean) must be considered. For a single brick at the origin, which contains a block of a sequence of pixels (column 5, lines 1-8 of Crean), the pixel address relative to the overall image in the

x-direction would be given by X. The output device scans in the X-direction, reaches the end, and returns to the beginning to resume scanning for each line (column 5, lines 12-19 of Crean). Therefore, for a brick that has a height in the Y-direction of 1, a width of Bw (L in Crean) and an offset of Bs (S in Crean) (column 5, lines 16-22 of Crean), the coordinate value I would inherently be determined according to a calculation wherein I = (X+Y*Bs)%Bw, where % denotes the remainder of the division operation that is retained as the coordinate value.

Regarding claim 17: Crean discloses that the lookup table stores gray level values (column 5, lines 38-41 of Crean) rendered from a digitized image that has a plurality of pixels (column 4, lines 30-34 of Crean) with each of the pixels being converted into a halftoned microdot that exists within one of the plurality of halftoning planes (column 5, lines 9-12 and column 6, lines 9-21 of Crean), wherein the microdots within the halftoning planes are indicative of the density value of the pixels rendered (column 4, lines 12-20 of Crean).

Regarding claim 18: Crean discloses that the lookup table stores a plurality of tiles from the microdots (figure 1 and column 4, lines 61-64 of Crean) in accordance with a screen angle (column 4, lines 62-64 of Crean) and a line ruling from a halftone screen (column 5, lines 16-22 of Crean) used to convert the pixels into the microdots (column 5, lines 23-27 of Crean), wherein each of the tiles comprises a repetitive sequence of microdots (column 6, lines 28-35 of Crean).

Regarding claim 19: Crean discloses that each of the microdots within the tiles is associated by a coordinate position, a density value as well as the plane value (column 5, lines 9-16 of Crean). Each microdot is organized within a pixel

based on the density value of said pixel (column 5, lines 23-27 of Crean). Said pixel is organized in the brick according to coordinate position (column 5, lines 9-11 of Crean). The density value essentially defines the plane value since each halftone threshold plane is used for comparison with an input density value (column 5, lines 23-27 of Crean).

Regarding claim 20: Crean discloses that the tiles stored within the lookup table buffer have a length and a width (figure 11 and column 10, lines 5-12 of Crean). The address of the data in the buffer is based on both the row number and column number of each dot.

Regarding claim 21: Crean discloses that the lookup table also stores an offset determined by the tile geometry stored therein, wherein the offset acts as a pointer to read data out offset by a predetermined amount in order to generate the repetitive sequence of microdots (column 6, lines 31-35 of Crean).

5. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crean (US Patent 5,745,249) in view of Shimura (US Patent 5,886,797) and Tai (US Patent 5,200,831).

Regarding claim 7: Crean discloses that the buffer that stores halftone rendering values in accordance with a dot growth pattern (column 4, lines 61-64 and column 5, lines 23-34 of Crean). The buffer is a form of memory that can be described as a lookup table since a lookup table requires simple memory addresses and corresponding values.

Crean in view of Shimura does not disclose expressly that said dot growth pattern is a mixed dot growth pattern.

Tai teaches using a mixed dot growth pattern (column 5, lines 10-14 of Tai).

Crean in view of Shimura is combinable with Tai because they are from the same field of endeavor, namely image halftone processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a mixed dot growth pattern as the dot growth pattern. The motivation for doing so would have been to provide more smoothness, less graininess, and more image details (column 6, lines 15-17 of Tai). Therefore, it would have been obvious to combine Tai with Crean in view of Shimura to obtain the invention as specified in claim 7.

Regarding claim 8: Crean discloses that the buffer further comprises a second lookup table and in the lookup table there are stored halftone rendering values (column 5, lines 9-12 of Crean). Said halftone rendering values are in accordance with a dot growth pattern (column 5, lines 23-27 of Crean). The halftone rendering values are a separate set of memory than the dot growth patterns (figure 7 and column 7, lines 37-40 of Crean). Therefore said values can be considered a second lookup table since a lookup table requires memory addresses and corresponding values. The pixel values are used as a least significant bits of the overall addressing scheme of the sequencer (column 7, lines 7-19 of Crean). Accessing these bits would give the device access to patterns based on a particular pixel value.

Crean in view of Shimura does not disclose expressly that said dot growth pattern is a partial dot growth pattern.

Tai teaches using a partial dot growth pattern (column 5, lines 10-14 of Tai).

Crean in view of Shimura is combinable with Tai because they are from the same field of endeavor, namely image halftone processing and printing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a partial dot growth pattern as the dot growth pattern. The motivation for doing so would have been to carry more information detail (column 6, lines 6-8 of Tai). Therefore, it would have been obvious to combine Tai with Crean in view of Shimura to obtain the invention as specified in claim 8.

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A.

Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
24 June 2005

THOMAS D. LEE
PRIMARY EXAMINER